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V. ISOETACEAE.

21. ISOETES.

A. Plants normally submerged; spores with low tubercles; plants of high altitudes *I. Bolanderi*.

AA. Plants of ephemeral winter pools; spores smooth; low altitudes. *I. Orcuttii*.

ISOETES BOLANDERI Engelm. Parry. Am. Nat. **8**: 214. 1874.

Illus.: Clute, The fern allies, p. 228. 1905.

"Formerly in the shallow stream which drained Bear Valley, which is now deeply submerged by the reservoir" (Parish, Pl. World **20**: 171. 1917). In 1918 discovered by H. H. Tracy at Switzers Meadows! growing along a brook that leads into Little Bear Lake (Arrowhead Lake) in the same mountains.

ISOETES ORCUTTII A. A. Eaton, Fern Bull. **8**: 13. 1900.

Illus.: Clute, The fern allies, p. 253. 1905.

Rare and local, known only from winter pools on the mesas near San Diego! (type locality), and near Upland! in San Bernardino Co. Specimens from these localities have been referred by various authors to *I. melanopoda* var. *pallida* (Parish, Bot. Gaz. **65**: 334. 1918 and Bull. So. Cal. Acad. **16**: 51. 1917) and to *I. Nuttallii* (McClatchie, Proc. So. Cal. Acad. **1**: 393. 1897). According to Dr. Norma Pfeiffer, in lit., our plants can be placed in *I. Orcuttii* except certain of Brandegee's San Diego collections which combine some of the characters of *I. Nuttallii*. We feel the agreement in range outweighs the atypical morphological characters and therefore, for the present, place all our material in *I. Orcuttii*.

(To be continued.)

Notes on the Fern Leaf Industry

GUSTAVE THOMMEN

The fern leaf industry constitutes an important item in the business of florists engaged in growing and selling

cut flowers. Maybe what I am going to describe may throw a little light upon the subject of how ferns are handled, before and after storage. I have my information from one of the largest dealers in Boston to whom I went to make sure of it. I have a friend who has been handling the fern department of the above dealer for a good many years, and who knows all the ins and outs of the business. I myself have watched the arrival, unpacking, sorting and selling of those ferns hundreds of times in this firm's store.

I cannot tell you how the men who make a business of collecting ferns work the thing today. Thirty and forty years ago I used to collect hundreds of thousands of ferns for use in the store where I was employed at that time. We went to the woods, where the ferns grew by the million, and simply picked what we wanted, selecting those fronds which suited our purposes best. We filled the left hand until we had 50 or 100. Then we tied the bundle with a string and placed it in a basket which each collector carried along. When the basket was full we called for the boy to take it away and he would leave another basket. The boy took the ferns to the wagon and piled them into empty cases. We always started early in the morning, say six o'clock (October) and had a regular picnic that day, taking things along for making fire and camping out. Next day we packed the ferns away in cold frames, outdoors, and covered them with about three inches of moist moss. When cold weather set in, the frames were covered with glass; later, on top of the glass, boards and, at last, from one to two feet of leaves or hay. Anything to keep out the frost and at the same time keep the ferns as cool as possible. In the winter, when we needed a new supply, we would open the frame and take out sufficient bunches to last us for say, three weeks. These we kept in a dark, moist, cellar or out-house, free from frost.

The commercial collectors do the collecting in a similar manner and store the fronds, in boxes containing about 10,000 fronds, in a cold storage house, at a temperature, as near as possible, of 31 to 32 degrees. When the wholesale or retail florist sends in his order, it is filled from this storage place. The wholesale florist houses rely entirely on the wholesale collectors for their wants. When the goods arrive, in lots of millions, they put them in some city refrigerating establishment and draw from there what they need, from day to day. In these refrigerating places the temperature is also kept at 31 to 32 degrees. All cases that come from the refrigerator have to be opened before the ferns are finally shipped to the retailer. This is absolutely necessary because there is always the possibility of finding a great number of fronds spoiled in each bunch. The bunches must be opened and inspected and every spoiled frond thrown out. This loss is always present and some years much more serious than at others. The contents of the cases may also vary considerably. It may happen, as it often does, that there is a loss of from 50 to 75%. The fronds have either shrivelled up, are decayed or only spotted with brown or the whole frond is brown, instead of green. The cause for this has not been properly inquired into or investigated. It seems to me, and to men who have handled ferns for many years, that the fern fronds may have been handled without the necessary care, before being packed into the boxes. They are probably left in big piles, where the chance of heating in the centre may be present. They may also have been subjected to improper temperature, either too much heat, which would cause shrivelling or to frost, which later on would cause decay. Bruising, from stepping on the bundles, would also cause trouble, etc.

The retail florist draws his supply of ferns from the wholesale house in the city as he needs it, either in small

lots, from day to day or week to week. Or he makes a standing contract to have so or so many cases delivered at specified times.

Collecting of ferns starts in July, in the north. New crop ferns from the South come about the beginning of April. These are not stored in the freezer but are sold as soon as they arrive. Collecting lasts until the weather makes it impossible, in the fall. Summer ferns can not be stored for any great length of time and, in fact, the later the fronds are harvested, the better they will stand cold storage.

One New England firm stores about 40 million of Dagger and Fancy ferns every fall. Sometimes the waste is fearful, especially was this last winter an uncommonly bad one. No doubt, a large part or maybe the greatest part of this loss could be prevented by proper caution, but, it seems funny, nobody seems to give this aspect even a thought. All what the dealers will say is: "The fern trade is some speculation, my boy. You make money, if they don't spoil, and you lose a devil of a pile if they do, so what's the use."

I have no positive knowledge, but I believe that the fern collecting and trade is much more important in Chicago than in Boston. Also I believe it is much harder to find supplies of northern grown ferns out West than in the East and especially in New England. Cut ferns always command a third better price out West than they do here and the supply is exhausted a month or two before we begin to get to the bottom of the pile.

BOSTON, MASS.

THE BRACKEN AS A POISONOUS PLANT—Much interest has been aroused among the farmers of Western Oregon by the publication of Professor Wm. E. Lawrence's bulletin on "The Principal Stock-Poisoning Plants of Oregon" (Ore. Ag. Coll. Exp. Sta. Bull. 187, Corvallis,